

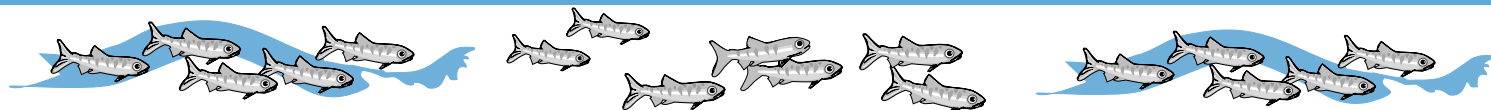


US Army Corps
of Engineers
North Pacific Division

Salmon Passage Notes

Snake and Columbia River Fish Programs

January 1997



Corps Releases Snake River Report

The Corps' Walla Walla District has released its Interim Status Report on the lower Snake River Juvenile Salmon Migration Feasibility Study. The report recommends continued evaluation of permanent natural river level drawdowns and surface bypasses as potential means of reconfiguring the four lower Snake River dams for improved salmon migration.

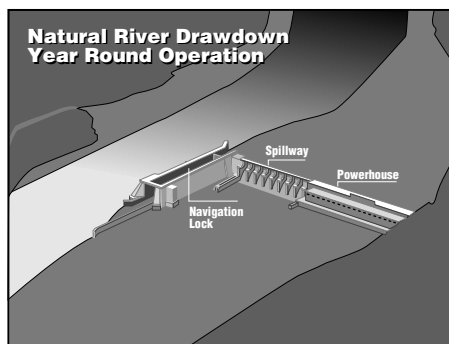
In the National Marine Fisheries Service Biological Opinion on hydropower operations, the Corps was tasked with studying a number of options for improving salmon passage through the lower Snake dams—Lower Granite, Little Goose, Lower Monumental, and Ice Harbor. The report provides the Corps recommendations for which of these options should receive further consideration.

The options include: 1) reservoir drawdowns; 2) surface bypass systems for juvenile fish; and 3) improved juvenile fish transportation, gas abatement measures, and others, jointly categorized as "current operational fish programs".

Reservoir drawdown is the lowering of reservoirs behind the dams to levels substantially below normal, to decrease the reservoir cross-section and increase water velocity. Natural river level drawdown would lower the reservoirs to pre-dam level. Annual or "seasonal", and permanent natural river level drawdowns were examined for the Interim Report. A mid-way level, called "spillway crest" was studied as well.

Further study of the mid-level drawdown was found to be unwarranted since extensive modifications to the fish passage systems at the dams would be needed, and evaluations indicate that salmon survival would not be as high as under current conditions. The implementation cost and schedule—over

\$1 billion and ten years—as well as extensive environmental impacts and potential damage to cultural resources from annual fluctuation of the river levels make this an imprudent option. Further study of seasonal natural river level drawdown should also be halted, mainly because repeating the 100 foot drawdowns every year would cause considerable detrimental environmental impact and cultural resource damage with each annual drawdown and refill of the reservoirs. There would be no chance for a stable habitat to establish. Implementation is very costly, estimated at nearly \$3.6 billion and 15 years to construct.

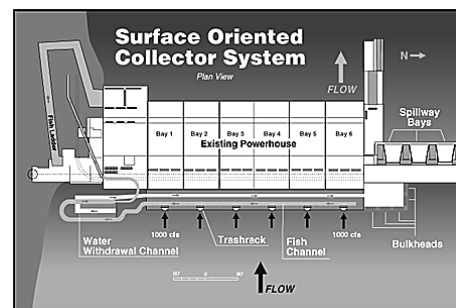


Permanent Natural River Drawdown Option.

Of the drawdown options, permanent natural river level is considered the preferred option. With a permanent natural river level drawdown scenario the river would bypass the dams completely, fish bypass systems would not be needed, and salmon survival could improve over existing in-river migratory conditions. The estimate to construct is \$533 million and five years. Effects on other river uses would be extensive—commercial navigation from the confluence with the Columbia River would no longer be possible, power production at the four dams would cease, and current recreation and irrigation uses would be affected.

Further study will address the many engineering, biological, and economic data gaps related to evacuating the reservoirs to achieve natural river drawdown. For example, engineering study of requirements for stabilizing the dam structures is not complete. Such factors as impacts of the loss of power generation need to be assessed. There is also a need for more biological information such as a measure of juvenile survival to below Bonneville Dam after passing through the four lower Columbia River dams.

Surface bypasses are another option being evaluated. These would be added onto dam structures to provide an alternative juvenile fish passage route to the current bypass systems. The idea is to attract or guide fish in the upper reaches of the water column before they are attracted to the flows created by turbine operation. In this way, fish can be "skimmed" near the surface and directed either over the dam spillway or into a bypass channel to enable them to bypass the dams.



Proposed Surface Collector for juvenile fish.

The prototype surface bypass collector installed at Lower Granite Dam in 1996 has provided valuable information, and further tests are planned. The Interim Report states that "the 1996 Lower Granite evaluation, as well as surface collector evaluations from other hydroelectric projects, have shown that the concept may

provide similar or more effective smolt collection than current [bypass systems]" and "may provide a more gentle method of collection" and reduced travel time for juvenile fish.

Further evaluation will generally focus on learning the hydraulic conditions that would be most conducive for attraction of fish to the surface bypass, the amount of water necessary for cost effective operation, and bypass methods.

The *current operational fish programs* include: bypass structures now in place at the lower Snake dams that guide fish away from the turbine intakes to bypass channels; spilling fish and water directly over the dam spillways; augmenting flows during juvenile fish migration seasons; and transporting juvenile fish past the dams in barges and trucks. Items being evaluated under these programs include improvements to the juvenile fish bypass structures and the transportation system, gas abatement measures to enable safer spill conditions, and improvements to turbine passage for the fish that are not diverted by spill or bypass.

Research on the effectiveness of juvenile fish transportation, dam mortalities of fish passing through the various dam passage routes, and effects of high dissolved gas levels on fish survival would help determine the best path for these migration survival improvements.

For a copy of the report contact Mr. Pete Poolman at 509-527-7261 or write to his attention at Corps of Engineers, 201 North Third Avenue, Walla Walla WA 99362-1876. The report is also available on the Internet at: <http://www.npw.usace.army.mil>.

Harza Report

Harza Northwest, Incorporated, a Bellevue, Washington consulting firm, has completed a report for the Corps of Engineers which provides a possible decision process for choosing options for long-term measures to improve salmon survival, through the lower Snake River corridor from the Lower Granite Dam to the confluence with the Columbia River.

The goals of the report were to: list options and possible outcomes; evaluate the options from a biological perspective; look at costs and risks of each option; lay out biological criteria for decision making; and estimate the cost effect of delaying decisions on which option to implement. The report examines potential costs of

several possible pathways to reconfigure the four lower Snake River Dams. In a recent briefing for the Northwest Power Planning Council, Harza's John Pizzimenti made it clear that the report does not point to any option as the answer—that the purpose of the report was not to recommend implementation of one option or the other.

The Harza report divides the options for change into three basic paths. One is to concentrate on the Juvenile Fish Transportation Program, the second is dam modification such as reservoir drawdown to improve in-river travel, and the third is a mixed approach using both transport and non-drawdown modifications to in-river travel. There are multiple tools in the mix of options, such as juvenile bypass system improvements, fish transportation, dam removal, and surface bypasses.

The report provides pros and cons of making a decision sooner rather than later on whether to implement one path or another. If the region can narrow the paths to pursue now, millions of dollars could be saved that might have been spent studying options that have no chance of being implemented or implementing paths that would become obsolete if another path were eventually chosen. For example, if natural river drawdowns were the choice, money should not be expended to study new systems and improvements that become moot with dam shutdown. On the other hand, if the political reality is that drawdown does not have a chance for implementation, time and money might be better spent elsewhere than on engineering designs and biological studies for drawdown.



Funding Memorandum of Agreement Signed

Five federal agencies involved in salmon and other fish and wildlife restoration activities in the Columbia River Basin have made a compact concerning Bonneville Power

Administration (BPA) fish and wildlife costs for Fiscal Years 1996 through 2001. The Memorandum of Agreement (MOA) follows an agreement made among BPA, National Marine Fisheries Service (NMFS), members of the Northwest congressional delegation and the Clinton Administration, to hold the line on BPA costs for Columbia Basin fish and wildlife at an average of \$435 million per year through the six-year period.

Efforts in the region to rebuild fish and wildlife resources affected by development of the hydropower system have been funded primarily by BPA ratepayers in the region. The scope of the activities over the years has been defined by the Northwest Power Planning Council Fish and Wildlife Program, and the NMFS and US Fish and Wildlife Service Biological Opinions for species listed under the Endangered Species Act.

Costs for these efforts have escalated dramatically in the past decade. In recognition of this, a funding Memorandum of Agreement has been worked out among the federal parties. The MOA recognizes the need to find a balanced approach to restoring fish and wildlife resources—one that assures adequate and stable funding for fish and wildlife activities while providing BPA a degree of financial stability in a very competitive energy market.

The MOA culminates months of intensive negotiations among the parties, with input from the Northwest Power Planning Council and Columbia Basin Indian tribes. The signers represent the Department of the Army for the Corps of Engineers, Department of Energy for BPA, Department of Interior for the US Fish and Wildlife Service and Bureau of Reclamation, and Commerce Department for NMFS.

Of the annual \$435 million, approximately \$183 million per year is BPA's estimate of costs associated with providing water for spill and flow augmentation for fish—water that might otherwise have been used to produce power. This leaves \$252 million for:

- ❖ \$100 million in fish and wildlife program activities that BPA funds directly, such as research, predator control, hatcheries, and habitat restoration;
- ❖ reimbursement payments of about \$40 million to pay back the Federal Treasury for costs to operate and maintain fish passage and hatchery facilities; and

- ❖ \$112 million in capital investment repayments to the US Treasury to pay for the cost of constructing fish passage facilities at the federal dams, and hatcheries. Repayments for capital construction are amortized over a number of years so this number represents an average yearly “mortgage” payment.

The MOA also describes the contingency fund established by the federal government in the amount of \$325 million, consisting of deductions available to BPA but not used under Section 4(h)(10)(C) of the Northwest Power Act. The money would be available to defray extra costs to BPA from certain emergencies, court-ordered actions, and years when water levels are low.

The MOA recognizes the United States’ trust obligation toward Indian Tribes and commits the federal agencies to improving consultation with the tribes and building more effective working relationships. The agreement also recognizes the Northwest Power Planning Council’s direct interest in regional fish and wildlife activities and commits the federal parties to consult with the Council about relevant issues and “attempt to reach a common viewpoint with the Council.”

The tribes, Council, states, and others will help steer and prioritize federal actions affecting fish and wildlife from year to year. An Annex to the MOA commits the parties to share with the tribes and the Council the “greatest amount of federal budget information possible in a timely fashion” to allow participation in budget management and allocation processes. The federal parties will provide informal quarterly reports of expenditures under the MOA.

Return to the River

The Northwest Power Planning Council’s Independent Scientific Group (ISG) has released its September 10 report “Return to the River” which represents the group’s views on how to approach the salmon recovery issue.

The ISG report lays out the group’s review of the science underlying current salmon recovery efforts. It has received high marks for its insights on ecological conditions necessary for recovery of depleted salmon runs in the Pacific Northwest.

The ISG report is not a detailed implementation plan and does not recommend specific measures for recovery. Instead, it addresses a conceptual overall approach to recovery based on current scientific knowledge and how well current measures are or are not working.

The ISG describes the critical elements of a conceptual scientific foundation as follows:

- ❖ Restoration of Columbia River salmon must address the entire natural and cultural ecosystem, including freshwater, estuarine and ocean habitats where salmon complete their life histories. This consideration includes human developments as well as natural habitats.
- ❖ Sustained salmon productivity requires a network of interconnected habitats, which are created, altered and maintained by natural physical processes in freshwater, the estuary and the ocean. These complex, high quality habitats are crucial for salmon spawning, rearing, migration, maintenance of food webs and predator avoidance.
- ❖ Life history diversity, genetic diversity and organization of the metapopulations—groups of interconnected populations in adjacent areas—are ways salmon adapt to their complex and connected habitats. This biodiversity and its organization contribute to the ability of salmon to cope with the environmental variation that is typical of freshwater and saltwater environments.

The ISG concluded that, because the complex freshwater-marine ecosystem in which the Pacific salmon originated and prospered has been substantially modified over the past century, current attempts to use technological and managerial remedies are not adequate substitutes for restoration of “normative” ecosystem conditions.

The group defines a normative ecosystem as one that provides specific conditions that are essential to maintaining diverse and productive populations. They note that one of the key conditions needed to get back to a normative river is a linked high-quality habitat throughout the upstream spawning and rearing areas, the migratory path through the rivers, and

the estuary and ocean habitat.

The ISG report describes seven general considerations for achieving restoration.

Management decisions should “nurture salmon life history and population diversity,” protecting core populations and reconnecting habitat areas at strategic areas in the Basin. The Hanford reach—a free-flowing stretch of river near the Hanford nuclear site above Richland Washington—is one model for this approach.

Protect and restore freshwater habitat for all life history stages. Restore the spring freshet (high flow) conditions that were a natural part of the Columbia River hydrology. Stabilize daily flow fluctuations to allow food webs to

persist. Reconnect restored tributary habitats to restored mainstem habitats, particularly where remnant core populations, such

as the Hanford Reach fall chinook, exist.

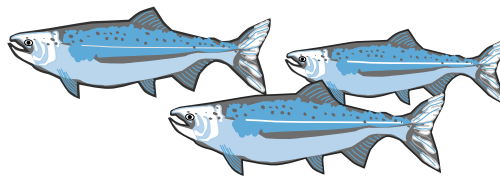
Emphasize riparian and upland land-use activities in watershed planning. Identify food web compositions and other key conditions critical for migrating juveniles in key habitats.

Manage stocks with a more complete understanding of migratory behavior and the limitations that migratory behavior could place on river operations.

Reduce the sources of mortality throughout the salmonids’ geographic ecosystem, including the river, estuary and ocean.

Recognize the importance of the estuary and ocean dynamics on salmon productivity when making river management decisions. Ocean and estuarine habitat conditions may have defining impacts on salmon populations, whatever actions are taken upstream.

Finally, consider the concept of “salmon reserves” as a means of protecting core salmon populations. These core populations could reseed available healthy habitat.



Visit the new Pacific Salmon Coordination Office page on the Internet under the Corps’ North Pacific Division web site at <http://www.npd.usace.army.mil>.

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